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MEASUREMENT OF MOTIVATION TO ACHIEVE IN PRESCHOOL CHILDREN. FINAL REPORT.

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A previous study was successful in designing an instrument to measure motivation which can be used with preschool children. The purpose of the present research was (1) to develop further the new instrument by giving it an initial trial on a substantial number of subjects, (2) to select and revise the test items on the basis of item analysis, and (3) to identify the factorial structure underlying the preschool childrens' responses. This study was conducted in Hawaii and involved 4- and 5-year -old children. Of the 182 subjects, 114 attended Head Start classes and 68 attended private preschools. The test instrument consisted of 200 items, each composed of a pair of figures and a short situational setting. The two figures in the item represented different responses to the situation. The child was told the situation and asked to choose the response he would make. Each response had a different motivational overtone. Thus, an evaluation of all of the child's responses provided an indication of his motivational structure. The item analysis of the data led to the elimination of 100 unnecessary items. The factorial structure was tentatively mapped, and data will be gathered to explore the validity of the instrument. Research is being planned to use this instrument to teach motivation to preschoolers. (WD)

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Measurement of Motivation to Achieve in Preschool Children

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Final Report

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Abstract

A new measure of motivation to achieve in school was given an initial trial on 200 four- and five-year-old children. This instrument presented in story format 200 items that focus on the behavior of imaginary figures called Gumpgookies. In each item two Gumpgookies respond differently to a semi-structured situation providing dichotomous options designed to determine the strength of learned responses hypothesized to be the constituents of motivation to achieve.

Item analysis assisted in the selection of the most promising 120 items, using both the total sample and a subsample of Head Start children identified as highly and lowly motivated to achieve. Factor analysis techniques eliminated an additional 20 items, provided some evidence for the seven-factor structure hypothetically underlying the responses, and tentatively identified three second-order factors.

Procedures for cross-validation are being planned, as well as research designed to teach motivation to achieve to preschoolers using this instrument as a criterion measure.

Problem

Although motivation to achieve in school is considered a crucial variable in determining academic success (Adkins & Ballif, 1967; Cattell, Sealy, & Sweeney, 1966; Gordon & Wilkerson, 1966; Gray, Klaus, Miller, & Forrester, 1966; Kagan, 1966; Kagan, Sontag, Baker, & Nelson, 1958; Robinson, 1967; Sears, 1966), progress in controlling this variable is stymied pending formal research producing effective means for such control. Indeed, a systematic development of instructional procedures to teach motivation to achieve does require empirical evidence that they control causative classroom variables. New curricular approaches sorely need painstaking investigation of what works and what doesn't work (Hunt, 1967); creative endeavors must be checked by precise measurement (McClelland, 1958).

Prerequisite to research designed to define effective instructional techniques, however, is identification of valid measures of motivation to achieve, since programs for effecting behavioral change require knowledge of conditions (Anastasi, 1967). Unfortunately, the lack of instruments of this nature is crippling such research (Crandall, 1964; Katz, 1967; McClelland, 1958). If headway is to be made, resources and energies need to be focused on the measurement problem, where real advances await methodological developments (McClelland, 1958).

The major influence in the design of instruments that measure achievement motivation has been the work of McClelland and his associates, who use fantasy as the medium through which themes, needs, goals, and other variables are scored for achievement content. Despite the appeal of this procedure, research on its effectiveness is inconclusive due to the non-comparability of the operational definitions used in the individual researches, the crudity of a method of measurement that allows possible intervention of other intellectual variables, and the serious conceptual dilemma as to whether or not achievement content in fantasy is reducible in operation to achievement behavior (Cofer and Appley, 1964: Klinger, 1966).

Further complications arise when these procedures are used with very young children. Preschoolers not only withdraw in the testing situation itself, but they also lack the verbal skills necessary to adequately describe their fantasy (Kagan, 1960). In addition, the absence of universal child-rearing practices does not allow young children to become exposed to any standardized series of experiences (Anastasi, 1954); consequently, both their understanding of picture stimuli and the content of their fantasy responses may be warped.

The promise of effective objective measures of motivation to achieve, however, encouraged exploratory research to identify procedures that would measure motivation to achieve in four- and five-year-old children (Adkins & Ballif, 1967). That study was successful in designing an instrument which can be used with preschool children and which holds promise as a measure of their motivation to achieve in school.

The purpose of the current research was to further develop the new instrument by giving it an initial trial on a substantial number of subjects, selecting and revising items on the basis of item analysis, and identifying the factorial structure underlying the responses.

Method

Instrument

This measure of motivation to achieve utilizes a story format and centers around imaginary little figures called Gumpgookies. Each item consists of two Gumpgookies in a semi-structured situation, with dichotomous options that have been designed to determine the strength of the following learned responses hypothesized to be the constituents of motivation to achieve: (1) purposive, i.e., establishing school achievement as a goal, (2) ethical, i.e., evaluating self-achievement as good conduct, (3) affective, i.e., expecting positive affect from achieving in school, (4) conceptual, i.e., conceptualizing self as an achiever, (5) cognitive, i.e., knowing instrumental behavior necessary for successfully achieving, (6) personal, i.e., possessing personal characteristics conducive to being motivated to achieve, and (7) social, i.e., possessing social skills that facilitate achievement motivation.

Each child is told that he has his own Gumpgookie and that although it looks like all the other Gumpgookies, it follows the child around and behaves exactly as he behaves--it likes what the child likes and it does what the child does. The test appears in an 8 1/2" x 11" book with illustrations of Gumpgookies on the left-hand pages and the written story on the right-hand pages (see Appendix A). As the tester reads the story and points to each Gumpgookie in turn as it is described, the child is asked to watch carefully and point to his own Gumpgookie in each situation. Each item is scored one or zero; a score of one means that the child responded in the direction assumed to indicate the presence of one of the response constituents of motivation to achieve.

The original 200 items were administered in two separate sets, 100 items in each of two sessions on different days but within two to four days. Each set of items was preceded by four practice items in which the consistency between the child's response and the response of his Gumpgookie was established by the tester. The testers were all female adults with some background in either psychology or education and included teachers, graduate students, and research assistants. All of the testers participated in a one-day training session including instruction on administration procedures as well as practice testing.

Subjects

From 55 Head Start classrooms, 110 children were selected by pooling judgments of the teacher and her two aides for each class as to the child most motivated to achieve and the child least motivated to achieve.

The 55 Head Start classes were randomly selected from a total of 89 classes on Oahu. An additional 42 children comprising three Head Start classes in particularly deprived areas (Honolulu Council of Social Agencies, 1966) were also included. 78 children in private preschools with middle- and upper-middle-class backgrounds completed the sample. From these original 234 children, however, 52 were eliminated for the following reasons: 30 withdrew from their classes, were absent for prolonged periods, or for other reasons did not complete the testing; 4 lacked adequate language and understanding skills to respond validly; and 18 responded in such a questionable manner that doubt was raised as to the validity of their scores. The final sample thus consisted of 182 children, 114 from Head Start classrooms and 68 from private preschools. All of the children were four- and five-year-olds eligible to enter kindergarten in the fall of 1967. Their ethnic backgrounds were primarily Oriental, Caucasian, and Polynesian.

Results

Total scores for the total sample were first analyzed in terms of mean, standard deviation, skewness, kurtosis, standard errors of the foregoing measures, normality of the distribution, and reliability as estimated by the Kuder-Richardson Formula 20. These test statistics were repeatedly computed for 160 items, 120 items, and 100 items as shown respectively in Table 1. Note that the significance of the skewness for both the 200 and 160 items was eliminated when the test was revised to 120 and 100 items.

Item analysis information was obtained for each of the 200 items, including difficulty index (per cent "correct"), standard deviation, and discriminative value against the total score as a criterion (point-biserial correlation coefficient). On the basis of these data, the 160 most promising items were retained and submitted to a second item analysis, which provided the basis for the elimination of an additional 40 items. The remaining 120 items were then submitted to a third item analysis and that information, with the help of results from the factor analysis techniques, provided a basis for eliminating another 20 items. The item analysis data for these final 100 items are shown in Table 2.

The percentage of the high- and of the low-25 percent of the total subjects as well as the percentage of the high- and of the low-motivated Head Start children choosing that response indicating the greater degree of motivation to achieve was computed for the original 200 items and is shown in Table 3. The differences of these percentages were also taken into consideration in selecting items for retention.

In view of the successive reductions in number of items on the basis of item analysis and factor analysis results, it is of course recognized that the reliability estimates for the smaller composites (Table 1) are inflated because of capitalization of chance errors. Since their is no ready means of estimating the extent of inflation except through cross-validation with a new sample, this is planned as a later step in the development of the test.

The matrix of inter-item phi correlation coefficients was factored by the principal-axes method as shown in Table 4. The factor matrix was rotated to an oblique simple structure using a biquartimin solution with $\gamma = .5$ (Carroll, 1963). This rotation permitted tentative identification of seven factors from two matrices: a structure matrix of the correlations between the items and the factors shown in Table 5, and a pattern matrix of the loadings of the reference vectors on the variables shown in Table 6.

The factor structure matrix shows the correlations of the items and is useful in the estimation of factors, but does not provide sufficient knowledge of the "saturation" of the items with the factors. The factor pattern matrix, however, gives this precisely and consequently shows more clearly the relationship of the items to the various clusters by distinctly displaying the patterns.

Originally it was planned to continue extraction of factors until some statistical criterion for number of factors had been met. The program for factoring that was used was capable of extracting as many as 20 factors. Since the data involved in the original intercorrelations being factored were for relatively unreliable items rather than for test or subtest scores, it was virtually certain that interpretation of as many as 20 rotated factors would be hazardous at best. In addition, it will be recalled that initially only seven possibly distinct factors had been hypothesized as potentially measurable components of what was regarded as motivation. Hence, partly on pragmatic grounds and partly in view of the theoretical basis for the construction of the items, it was decided to limit the rotation to the first 7 principal-axes factors.

It is true that these 7 factors account for only 38.11% of the total variance. It was felt, however, that much of the remaining variance would be attributable to unique and error factors rather than to interpretable common factors.

The inter-factor correlations for these seven factors as shown in Table 7 were then factored, yielding a three-factor, second-order matrix as shown in Table 8. This matrix was also rotated to an oblique simple structure by means of a biquartimin solution. Table 9 shows the second-order structure matrix and Table 10 shows the second-order pattern matrix. The correlations between the three second-order factors are shown in Table 11. A possible next step might be to include the correlation of each item with the second-order factors.

Table 1

Test Statistics for 200, 160, 120, and 100 Items

	Items			
	200	160	120	100
Mean	118.91	101.01	80.43	67.66
Standard Error	0.97	1.22	1.09	0.96
Standard Deviation	13.68	16.46	14.69	13.01
Standard Error	0.64	0.81	0.69	0.61
Skewness	0.40*	0.43*	0.15	0.01
Standard Error	0.17	0.18	0.18	0.18
Kurtosis	-0.26	-0.26	-0.38	-0.37
Standard Error	0.34	0.36	0.36	0.36
Number of Subjects	200	182**	182	182
Reliability KR 20	0.76	0.87	0.89	0.83

* $p<.05$
** 18 subjects were eliminated because of doubt as to validity of scores.

Table 2

Item Difficulty Indices, Standard Deviations, and Discriminative Values Against the Final Total Score of the 100 Selected Items

Item	Difficulty Index	Standard Deviation	Discriminative Value
1	0.79	0.41	0.32
3	0.75	0.43	0.33
7	0.73	0.44	0.30
8	0.70	0.46	0.30
13	0.54	0.50	0.22
15	0.52	0.50	0.33
17	0.64	0.48	0.18
18	0.55	0.50	0.24
20	0.55	0.50	0.36
25	0.82	0.38	0.29
28	0.56	0.50	0.35
29	0.62	0.48	0.29
30	0.75	0.44	0.28
32	0.78	0.41	0.13
34	0.75	0.44	0.26
36	0.53	0.50	0.32
39	0.73	0.44	0.42
43	0.59	0.49	0.36
45	0.65	0.48	0.22
48	0.73	0.44	0.36
49	0.82	0.38	0.33
50	0.73	0.44	0.25
53	0.68	0.47	0.38
54	0.60	0.49	0.34
56	0.70	0.46	0.37
57	0.74	0.44	0.45
59	0.72	0.45	0.50
60	0.53	0.50	0.24
61	0.65	0.48	0.23
62	0.63	0.48	0.40
65	0.77	0.42	0.14
66	0.66	0.47	0.39
71	0.75	0.43	0.25
76	0.68	0.47	0.30
77	0.68	0.47	0.35
78	0.65	0.48	0.21
79	0.65	0.48	0.37
81	0.50	0.50	0.22
82	0.66	0.47	0.28
83	0.74	0.44	0.20

Table 2 (continued)

Item	Difficulty Index	Standard Deviation	Discriminative Value
84	0.62	0.48	0.21
85	0.72	0.45	0.28
87	0.82	0.38	0.34
90	0.78	0.41	0.28
93	0.59	0.49	0.22
94	0.68	0.47	0.16
96	0.73	0.44	0.18
99	0.71	0.45	0.34
101	0.52	0.50	0.29
102	0.58	0.49	0.30
106	0.69	0.46	0.31
108	0.79	0.41	0.24
109	0.62	0.49	0.30
111	0.64	0.48	0.35
113	0.71	0.45	0.24
115	0.60	0.49	0.20
116	0.65	0.48	0.39
117	0.67	0.47	0.22
122	0.70	0.46	0.22
124	0.66	0.47	0.18
126	0.60	0.49	0.24
128	0.66	0.47	0.43
129	0.80	0.40	0.13
130	0.60	0.49	0.20
131	0.58	0.49	0.35
132	0.77	0.42	0.29
133	0.59	0.49	0.21
136	0.78	0.42	0.41
137	0.81	0.39	0.32
139	0.66	0.47	0.31
140	0.56	0.50	0.16
143	0.68	0.47	0.27
144	0.70	0.46	0.30
146	0.68	0.47	0.28
147	0.71	0.45	0.32
150	0.68	0.47	0.28
152	0.72	0.45	0.21
153	0.76	0.42	0.35
154	0.35	0.48	0.25
156	0.77	0.42	0.42
158	0.77	0.42	0.28
160	0.64	0.48	0.29
161	0.66	0.47	0.20

Table 2 (continued)

Item	Difficulty Index	Standard Deviation	Discriminative Value
163	0.81	0.39	0.31
164	0.67	0.47	0.26
165	0.65	0.48	0.32
168	0.63	0.48	0.24
169	0.84	0.37	0.34
170	0.63	0.48	0.16
171	0.69	0.46	0.28
172	0.69	0.46	0.16
175	0.66	0.47	0.27
177	0.73	0.44	0.15
182	0.74	0.44	0.37
184	0.71	0.45	0.31
188	0.71	0.45	0.34
193	0.75	0.44	0.36
194	0.54	0,50	0.16
195	0.64	0.48	0.31
197	0.75	0.43	0.16

Table 3

Percentages of High- and of Low-25 Percent of Total Sample and Percentages of High- and of Low-Motivated Head Start Children Choosing Response Indicating Presence of Motivation to Achieve

Item	High-25%	Low-25%	Difference	High-Motivated	Low-Motivated	Difference
1	.94	.72	.22	.80	.66	.14
2	.48	.46	.02	.40	.37	.03
3	.94	.58	.36	.67	.74	-.07
4	.62	.60	.02	.67	.60	.07
5	.70	.48	.22	.62	.60	.02
6	.64	.44	.20	.60	.54	.06
7	.88	.50	.38	.69	.54	.15
8	.82	.60	.22	.69	.66	.03
9	.66	.48	.18	.53	.57	-.04
10	.82	.64	.18	.76	.66	.10
11	.82	.62	.20	.80	.63	.17
12	.38	.24	.14	.31	.34	-.03
13	.58	.42	.16	.49	.51	-.02
14	.92	.64	.28	.89	.71	.18
15	.74	.44	.30	.44	.34	.10
16	.64	.46	.18	.49	.51	-.02
17	.84	.44	.40	.69	.54	.15
18	.72	.46	.26	.47	.49	-.02
19	.38	.42	.04	.33	.46	-.13
20	.74	.40	.34	.58	.49	.09
21	.66	.54	.12	.60	.40	.20
22	.76	.46	.30	.62	.60	.02
23	.30	.42	-.12	.36	.37	-.01
24	.40	.44	.04	.56	.46	.10
25	.96	.68	.28	.89	.57	.32
26	.48	.44	.04	.40	.63	-.23
27	.56	.54	.02	.53	.49	.04
28	.78	.30	.48	.44	.43	.01
29	.72	.50	.22	.69	.40	.29
30	.90	.68	.22	.80	.63	.17
31	.46	.30	.16	.33	.40	-.07
32	.92	.66	.26	.82	.71	.11
33	.66	.52	.14	.64	.69	-.05
34	.92	.46	.46	.71	.57	.14
35	.20	.32	-.12	.29	.29	.00
36	.68	.46	.22	.51	.43	.08
37	.72	.58	.14	.58	.51	.07
38	.44	.50	-.06	.47	.49	-.02
39	.92	.60	.32	.82	.49	.33
40	.68	.50	.18	.49	.51	-.02

Table 3 (continued)

Item	High-25%	Low-25%	Difference	High-Motivated	Low-Motivated	Difference
41	.54	.48	.06	.51	.46	.05
42	.44	.52	-.08	.58	.51	.07
43	.80	.42	.38	.76	.46	.30
44	.44	.50	-.06	.47	.54	-.07
45	.74	.62	.12	.73	.57	.16
46	.44	.48	-.04	.38	.46	-.08
47	.58	.50	.08	.47	.54	-.07
48	.84	.60	.24	.80	.57	.23
49	.96	.58	.38	.87	.51	.36
50	.84	.60	.24	.76	.63	.13
51	.66	.56	.10	.47	.69	-.22
52	.90	.64	.26	.82	.74	.08
53	.88	.52	.36	.71	.34	.37
54	.80	.46	.34	.56	.49	.07
55	.58	.48	.10	.51	.63	-.12
56	.86	.56	.30	.76	.60	.16
57	.96	.56	.40	.91	.46	.45
58	.46	.44	.02	.31	.46	-.15
59	.94	.50	.44	.73	.51	.22
60	.68	.48	.20	.53	.46	.07
61	.84	.52	.32	.71	.51	.20
62	.84	.46	.38	.64	.51	.13
63	.80	.62	.18	.67	.69	-.02
64	.60	.48	.12	.49	.46	.03
65	.90	.72	.18	.69	.77	-.08
66	.82	.36	.46	.80	.43	.37
67	.82	.64	.18	.58	.69	-.11
68	.50	.58	-.08	.47	.51	-.04
69	.92	.68	.24	.73	.69	.04
70	.76	.42	.34	.60	.49	.11
71	.90	.58	.32	.71	.86	-.15
72	.78	.62	.16	.64	.69	-.05
73	.82	.82	.00	.93	.91	.02
74	.72	.40	.32	.47	.40	.07
75	.80	.72	.08	.71	.69	.02
76	.82	.52	.30	.76	.54	.22
77	.82	.56	.26	.69	.51	.18
78	.72	.54	.18	.73	.43	.30
79	.18	.52	-.34	.42	.60	-.18
80	.38	.32	.06	.36	.46	-.10
81	.66	.36	.30	.58	.46	.12
82	.82	.50	.32	.78	.49	.29

Table 3 (continued)

Item	High-25%	Low-25%	Difference	High-Motivated	Low-Motivated	Difference
83	.86	.66	.20	.76	.63	.13
84	.86	.52	.34	.64	.60	.04
85	.92	.66	.26	.71	.57	.14
86	.76	.48	.28	.73	.60	.13
87	.92	.62	.30	.91	.60	.31
88	.38	.40	-.02	.44	.40	.04
89	.62	.48	.14	.64	.57	.07
90	.90	.64	.26	.80	.69	.11
91	.56	.40	.16	.58	.34	.24
92	.38	.42	-.04	.44	.34	.10
93	.86	.52	.34	.58	.54	.04
94	.84	.60	.24	.71	.71	.00
95	.64	.62	.02	.58	.83	-.25
96	.88	.64	.24	.82	.63	.19
97	.72	.66	.06	.80	.69	.11
98	.60	.64	-.04	.53	.77	-.24
99	.82	.46	.36	.80	.46	.34
100	.24	.42	-.18	.31	.54	-.23
101	.64	.40	.24	.58	.34	.24
102	.74	.50	.24	.56	.49	.07
103	.38	.52	-.14	.44	.66	-.22
104	.76	.64	.12	.62	.57	.05
105	.82	.60	.22	.69	.69	.00
106	.84	.54	.30	.71	.49	.22
107	.42	.52	-.10	.51	.43	.08
108	.94	.60	.34	.80	.74	.06
109	.32	.54	.22	.47	.60	-.13
110	.44	.30	.14	.58	.43	.15
111	.82	.42	.40	.67	.46	.21
112	.34	.48	-.14	.47	.54	-.07
113	.76	.56	.20	.69	.60	.09
114	.86	.78	.08	.80	.74	.06
115	.66	.46	.20	.64	.49	.15
116	.78	.50	.28	.71	.46	.25
117	.86	.64	.22	.69	.60	.09
118	.84	.68	.16	.87	.74	.13
119	.72	.60	.12	.84	.69	.15
120	.66	.54	.12	.49	.49	.00
121	.86	.42	.44	.84	.57	.27
122	.90	.50	.40	.76	.57	.19
123	.44	.40	.04	.33	.43	-.10
124	.82	.52	.30	.62	.54	.08
125	.84	.68	.16	.80	.66	.14

Table 3 (continued)

Item	High-25%	Low-25%	Difference	High-Motivated	Low-Motivated	Difference
126	.70	.46	.24	.56	.54	.02
127	.62	.40	.22	.42	.46	-.04
128	.78	.48	.30	.67	.54	.13
129	.10	.26	-.16	.20	.23	-.03
130	.62	.60	.02	.64	.49	.15
131	.76	.48	.28	.58	.37	.21
132	.92	.58	.34	.78	.60	.18
133	.72	.54	.18	.53	.43	.10
134	.92	.64	.28	.78	.71	.07
135	.56	.44	.12	.36	.54	-.18
136	.94	.62	.32	.89	.60	.29
137	.94	.60	.34	.84	.69	.15
138	.48	.38	.10	.51	.46	.05
139	.72	.52	.20	.76	.51	.24
140	.76	.42	.34	.53	.54	-.01
141	.52	.48	.04	.56	.51	.05
142	.62	.48	.14	.56	.46	.10
143	.80	.54	.16	.76	.51	.25
144	.88	.50	.38	.69	.51	.18
145	.56	.44	.12	.49	.46	.03
146	.76	.44	.32	.78	.57	.21
147	.88	.56	.32	.67	.63	.04
148	.62	.44	.18	.42	.43	-.01
149	.52	.36	.16	.47	.49	-.02
150	.26	.52	-.26	.29	.43	-.14
151	.76	.50	.26	.53	.43	.10
152	.90	.48	.42	.69	.51	.18
153	.92	.60	.32	.82	.71	.11
154	.54	.30	.24	.27	.34	-.07
155	.24	.40	-.16	.22	.37	-.15
156	.96	.54	.42	.82	.63	.19
157	.44	.42	.02	.42	.40	.02
158	.08	.34	-.26	.22	.31	-.09
159	.26	.54	-.28	.40	.60	-.20
160	.86	.46	.40	.76	.43	.33
161	.80	.62	.18	.67	.60	.07
162	.98	.74	.24	.93	.77	.16
163	.94	.68	.26	.84	.66	.18
164	.80	.66	.14	.71	.57	.14
165	.20	.42	-.22	.27	.57	-.30
166	.62	.52	.10	.47	.57	-.10
167	.32	.58	-.26	.51	.46	.05

Table 3 (continued)

Item	High-25%	Low-25%	Difference	High-Motivated	Low-Motivated	Difference
168	.70	.54	.16	.64	.57	.07
169	.96	.60	.36	.84	.74	.10
170	.74	.52	.22	.67	.57	.10
171	.80	.50	.30	.73	.49	.24
172	.82	.54	.28	.69	.51	.18
173	.62	.40	.22	.49	.54	-.05
174	.54	.32	.22	.53	.46	.13
175	.86	.48	.38	.62	.46	.16
176	.46	.16	.30	.31	.31	.00
177	.80	.74	.06	.80	.71	.09
178	.56	.40	.16	.56	.51	.05
179	.42	.46	-.04	.58	.40	.18
180	.62	.66	-.04	.53	.71	-.18
181	.56	.46	.10	.49	.51	-.02
182	.90	.56	.34	.67	.69	-.02
183	.42	.38	.04	.42	.49	-.07
184	.90	.66	.24	.71	.69	.02
185	.52	.64	-.12	.58	.60	-.02
186	.62	.34	.28	.56	.40	.16
187	.40	.56	-.14	.49	.49	.00
188	.86	.52	.34	.71	.60	.11
189	.66	.36	.30	.62	.49	.13
190	.74	.66	.08	.64	.74	-.10
191	.46	.34	.12	.44	.49	-.05
192	.54	.50	.04	.64	.54	.10
193	.98	.48	.50	.78	.57	.21
194	.32	.54	-.22	.44	.54	-.10
195	.82	.32	.50	.76	.57	.19
196	.40	.20	.20	.33	.31	.02
197	.86	.58	.28	.84	.57	.27
198	.84	.64	.20	.62	.51	.11
199	.70	.60	.10	.69	.63	.06
200	.32	.50	-.18	.42	.43	-.01

Table 4

First-Order Principal-Axes Factor Matrix

Items	Factors							h^2
	1	2	3	4	5	6	7	
1	.35	.04	.02	-.14	-.29	-.02	-.00	.23
3	.28	.21	.07	-.28	-.05	.03	-.17	.24
7	.36	-.01	.10	-.34	-.04	.14	-.12	.29
8	.35	-.03	-.12	-.03	-.14	-.24	.18	.25
13	.20	.05	.12	.18	-.30	.07	-.24	.24
14	.06	.18	-.07	-.21	-.06	.08	.46	.31
15	.30	.14	.23	-.15	-.08	.06	-.29	.28
17	.04	.27	.02	.05	.36	.28	-.03	.29
18	.26	.02	.12	.02	-.12	-.20	-.12	.15
20	.33	.14	.25	-.03	-.07	.26	-.06	.27
22	-.02	.26	-.06	-.08	.05	.27	.06	.16
25	.33	.05	.15	-.21	-.31	.07	.00	.28
28	.35	.12	.11	.21	-.18	.18	.06	.26
29	.36	-.08	.38	.04	-.07	.22	.13	.35
30	.29	.06	.11	.02	.14	.01	.11	.13
32	-.12	.51	-.07	-.23	.14	-.10	.01	.36
34	.09	.37	-.01	-.13	-.06	-.00	-.09	.17
36	.34	.02	-.03	.33	-.05	.04	-.10	.24
39	.48	-.00	.12	.06	.16	-.17	-.01	.30
43	.41	-.03	.27	.17	.13	-.08	-.22	.34
45	.30	-.13	.27	.18	-.05	-.30	-.02	.30
48	.43	-.04	-.07	.18	-.12	-.27	.09	.32
49	.24	.25	-.01	.15	-.23	-.27	.20	.31
50	.22	.13	.04	.19	-.04	-.30	.18	.23
52	-.01	.28	-.24	-.07	.06	-.13	.20	.20
53	.42	.03	.29	.45	-.03	.05	.00	.47
54	.41	-.02	.26	.14	-.06	.22	-.13	.32
56	.47	-.09	.23	.16	-.19	-.09	-.15	.37
57	.43	.19	-.03	.17	-.25	.03	.30	.40
59	.54	.08	.14	.11	.16	-.02	.05	.36
60	.29	-.06	.14	.01	.02	-.02	-.19	.14
61	-.05	.57	-.14	-.07	-.08	-.02	.05	.36
62	.42	.10	-.04	-.25	-.06	.10	.29	.35
65	-.04	.03	.02	-.05	.23	.09	.13	.20
66	.42	.07	.04	.16	-.30	.00	.36	.42
67	-.15	.39	-.08	-.10	-.00	-.10	-.23	.25
69	-.10	.40	-.08	-.20	-.01	-.07	-.10	.23
70	.06	.40	.09	.12	-.00	.12	-.09	.21
71	.00	.53	-.24	.18	-.10	.08	.04	.39
72	-.14	.37	.03	-.00	-.04	.28	-.08	.24

Table 4 (continued)

Items	Factors							h^2
	1	2	3	4	5	6	7	
74	.36	.02	.37	-.11	.04	.06	.04	.29
76	.21	.24	-.09	-.08	.21	-.00	-.25	.22
77	.49	-.14	.14	-.03	.20	-.07	.02	.33
78	.35	-.20	.16	-.09	.05	.03	.08	.21
79	.46	-.06	.11	-.13	.02	-.02	.07	.25
81	-.01	.48	.01	-.01	.06	.12	.09	.26
82	.34	-.05	.06	-.13	-.12	-.09	.23	.21
83	.21	-.01	.16	-.14	.05	.01	.30	.18
84	-.01	..43	-.10	.23	-.04	.00	-.06	.25
85	.08	.44	-.12	..08	.41	.02	-.00	.39
87	.39	.02	-.12	-.05	.15	-.01	.26	.26
90	.37	-.04	.10	-.06	.03	.13	-.10	.18
93	-.02	..49	-.07	.08	-.13	.11	-.01	.28
94	-.09	.52	-.11	.17	.09	.22	.10	.39
96	-.03	.42	.02	.21	.15	-.29	.02	.33
99	.38	.07	.29	-.24	.15	-.16	.09	.35
100	.41	-.17	.12	-.04	-.08	.13	.07	.24
101	.33	-.00	.27	.06	-.10	.03	.11	.21
102	.28	.11	.14	-.41	.08	.12	-.11	.31
103	.33	-.04	.16	.04	.24	-.11	-.05	.21
106	.40	-.10	-.10	-.16	.12	.04	.23	.27
108	.13	.29	.04	-.36	-.16	-.31	-.13	.37
109	.40	-.16	-.00	-.09	.19	.11	-.19	.28
111	.42	-.04	-.13	-.25	..01	-.01	.17	.29
113	.35	-.17	-.23	.12	.01	-.17	.15	.27
114	.02	.08	.20	-.23	-.22	.08	-.15	.10
115	.28	-.13	.01	-.13	.01	.10	.09	.13
116	.46	-.02	-.12	.16	.12	.06	-.16	.30
117	-.00	.41	.03	.04	.02	.09	-.24	.24
121	.41	.10	.14	-.08	-.05	-.12	.13	.24
122	.02	.43	.08	.07	-.12	-.03	-.16	.24
124	-.03	.42	-.09	-.16	.04	.05	-.32	.32
126	.31	-.08	-.21	.02	.03	.12	.07	.17
127	.07	.20	-.22	-.01	.06	.12	-.12	.13
128	.55	-.11	-.05	-.04	.23	.00	.08	.38
129	-.10	.42	.10	-.22	-.05	.14	.10	.28
130	.31	-.21	-.09	.16	.35	-.22	-.17	.37
131	..34	.10	-.02	-.00	.34	.03	-.02	.24
132	.33	-.02	-.25	-.22	.18	.09	.12	.28
133	.25	-.05	-.03	-.09	.22	.15	-.06	.15
134	.05	.17	.19	-.10	-.05	.04	.07	.09
136	.46	.00	-.07	-.20	.14	-.25	-.11	.35
137	.34	.08	-.31	-.10	-.27	-.05	-.09	.31
138	.32	-.25	.02	-.32	.04	.01	-.10	.28

Table 4 (continued)

Items	Factors							h^2
	1	2	3	4	5	6	7	
139	.41	-.13	-.21	.09	-.01	-.03	-.28	.32
140	-.05	.40	-.04	-.03	.01	.11	.20	.22
143	.35	-.11	-.10	-.08	.05	-.00	-.06	.16
144	.08	.49	.04	-.05	-.10	-.15	-.07	.29
145	.32	-.11	-.05	.02	.15	.10	.05	.15
146	.35	-.06	-.24	.15	-.21	.06	-.04	.26
147	.32	.07	-.14	.25	.00	.35	-.16	.34
148	-.14	.33	.33	.12	.01	.07	.04	.26
150	.22	.18	-.27	-.07	.18	-.24	-.03	.25
152	-.00	.46	.06	-.06	-.15	-.18	-.16	.30
153	.35	.06	-.41	-.12	-.06	-.00	-.04	.31
154	.04	.44	.20	.16	.06	.16	-.19	.33
156	.43	.12	-.32	.02	-.11	.04	-.01	.32
158	.30	.03	-.32	.30	-.13	-.02	.04	.30
159	.40	.03	-.11	.20	.25	.04	.06	.28
160	.11	.43	.21	.11	-.08	.03	.08	.27
161	.26	-.09	-.14	-.03	-.06	.29	.14	.20
162	.40	.00	.10	-.04	-.12	.00	-.18	.22
163	.36	-.01	-.32	-.06	-.01	.02	-.10	.25
164	.27	.02	-.12	-.04	-.19	.02	-.11	.14
165	.14	.42	.12	.06	.21	-.07	.12	.28
168	.30	-.08	-.08	.04	.11	.30	-.18	.24
169	.33	.13	-.21	.21	-.05	-.17	-.18	.28
170	.01	.26	.09	-.12	.13	-.24	-.01	.16
171	.36	-.11	-.18	.13	.07	-.19	.01	.23
172	-.05	.42	.13	.17	.05	.08	.20	.27
175	.08	.41	.13	.12	.18	-.08	.14	.26
176	.06	.23	.14	-.14	.08	.11	-.00	.11
177	.04	.23	.04	.13	.06	.01	.14	.10
182	.37	.09	-.24	.18	-.02	.28	-.05	.32
184	.30	.11	-.33	-.05	-.20	-.01	-.02	.25
188	.33	.13	-.21	-.07	-.06	.13	.04	.20
193	.16	.47	.01	-.17	-.27	-.10	.01	.36
194	-.06	.40	.04	.11	.00	-.21	.04	.22
195	.16	.36	-.17	-.08	.12	-.18	.05	.24
197	.00	.32	.28	-.04	.18	-.40	-.01	.38
Eigen-values	10.26	7.43	3.37	2.93	2.62	2.63	2.52	

Table 5

First-Order Oblique Factor Structure Matrix

Item	Factors						
	1	2	3	4	5	6	7
1		0.33				0.30	
3				0.46			
7				0.37			
8		0.38					0.31
13					0.36		
14						0.36	
15				0.44			
17	0.33						
18							0.32
20				0.34	0.33		
22							
25				0.36		0.33	
28					0.38		
29					0.48	0.39	
30							
32	0.44			0.34	-0.45		
34				0.36			
36		0.35			0.34		
39			0.47			0.30	0.35
43			0.43		0.41		
45					0.37		0.44
48		0.41					0.42
49							0.44
50							0.43
52					-0.32		
53			0.32		0.54		0.31
54			0.33		0.51		
56		0.31			0.34		0.36
57		0.42				0.42	
59		0.32	0.52		0.35	0.38	
60							
61	0.52			0.33	-0.33		
62		0.30				0.54	
65	0.38						
66		0.36			0.35	0.48	
67	0.31				-0.30		
69	0.31			0.32	-0.32		
70	0.41						
71	0.54						

Table 5 (continued)

Item	Factors						
	1	2	3	4	5	6	7
72	0.38						
74			0.30		0.34	0.35	
76			0.34				
77			0.49		0.33	0.38	
78					0.32	0.36	
79			0.37			0.42	
81	0.49						
82						0.43	
83						0.39	
84	0.44						
85	0.46		0.31				
87			0.36			0.42	
90			0.34		0.30		
93	0.48						
94	0.58						0.35
96	0.42						
99			0.37	0.33		0.39	0.32
100					0.41	0.40	
101					0.37	0.32	
102				0.46			
103			0.40				
106			0.36			0.47	
108				0.47			0.34
109			0.46				
111		0.34	0.32			0.46	
113		0.37					
114				0.33			
115						0.32	
116		0.42	0.48		0.30		
117	0.37			0.31			
121						0.39	0.33
122	0.38			0.31			
124	0.33			0.40			
126		0.33					
127							
128		0.36	0.56			0.44	
129	0.39			0.36			
130			0.46				
131			0.47				
132			0.35			0.34	
133			0.34				
134							

Table 5 (continued)

Item	Factors						
	1	2	3	4	5	6	7
136		0.34	0.46				0.31
137		0.51					
138	-0.34						
139		0.47	0.38				
140	0.42						
143			0.32				
144	0.42			0.39			
145			0.34				
146		0.47					
147		0.38	0.30				
148	0.38						
150							
152	0.37			0.39			
153		0.59					
154	0.46			0.32			
156		0.55	0.31				
158		0.47					
159		0.32	0.46				
160	0.45						
161							
162		0.30			0.34		
163		0.46	0.31				
164		0.33					
165	0.44						
168			0.34				
169		0.45					
170							
171		0.36	0.33				
172	0.49						
175	0.44						
176							
177							
182		0.46	0.32				
184		0.47					
188		0.39					
193	0.37			0.47			
194	0.39						
195	0.31						
197							0.44

Only values of .30 and above are included.

Table 6

First-Order Oblique Factor Pattern Matrix

Item	Factors 1	2	3	4	5	6	7
1							
3				0.47			
7				0.46			
8		0.33					
13					0.46		
14						0.58	
15				0.47			
17	0.38		0.43				
18							
20					0.39		
22							
25				0.39			
28	0.34				0.44		
29					0.51		
30							
32					-0.42		
34							
36					0.34		
39			0.38				
43			0.40		0.36		
45							0.43
48							0.34
49							0.38
50							0.40
52					-0.40		
53	0.39				0.64		
54					0.55		
56					0.46		
57	0.38	0.31				0.36	
59			0.39				
60							
61	0.36						
62						0.53	
65	0.35						
66	0.30					0.44	
67							
69							
70	0.42						
71	0.54	0.38					
72	0.37						

Table 6 (continued)

Item	Factors						
	1	2	3	4	5	6	7
74							
76			0.37				
77			0.43				
78							
79							
81	0.46						
82						0.40	
83						0.44	
84	0.44						
85	0.40		0.48				
87						0.38	
90							
93	0.45						
94	0.65						
96	0.35						0.36
99							
100							
101					0.35		
102				0.50			
103			0.44				
106						0.42	
108				0.53			0.32
109			0.43				
111						0.39	
113							
114				0.45			
115							
116			0.37				
117							
121							
122							
124				0.40			
126							
127							
128			0.45				
129							
130			0.59				
131			0.53				
132					-0.30		
133			0.36				
134							
136	-0.31		0.36				
137		0.60					
138	-0.46						
139		0.40					
140	0.41						
143							
144							

Table 6 (continued)

Item	Factors						
	1	2	3	4	5	6	7
145							
146		0.50					
147		0.31			0.36		-0.31
148	0.44	-0.34					
150					-0.40		
152				0.33			
153		0.56					
154	0.47						
156		0.55					
158		0.52					
159			0.43				
160	0.47						-0.31
161							
162							
163		0.45					
164		0.34					
165	0.41						-0.32
168							
169		0.42					
170							
171							
172	0.59						
175	0.45						
176							
177	0.34						
182		0.42					
184		0.56					
188		0.35					
193				0.38			
194	0.31						
195					-0.35		
197		-0.34					0.49

Table 7

Intercorrelation Coefficients of First-Order Factors

	Factors						
	1	2	3	4	5	6	7
1	1.00	0.03	0.02	0.42	-0.34	-0.12	0.16
2	0.03	1.00	0.53	0.18	0.35	0.38	0.26
3	0.02	0.53	1.00	0.27	0.36	0.42	0.23
4	0.42	0.19	0.27	1.00	0.02	0.18	0.22
5	-0.34	0.35	0.36	0.02	1.00	0.40	0.20
6	-0.12	0.38	0.42	0.18	0.40	1.00	0.21
7	0.16	0.26	0.23	0.22	0.20	0.21	1.00

Table 8

Second-Order Principal-Axes Factor Matrix

	Factors			h^2
	I	II	III	
1	0.01	0.88	0.04	0.78
2	0.75	0.00	0.08	0.57
3	0.78	0.02	0.24	0.67
4	0.41	0.67	0.25	0.68
5	0.63	-0.50	-0.10	0.66
6	0.70	-0.20	0.17	0.56
7	0.51	0.27	-0.80	0.97
Eigenvalues	2.49	1.59	.81	

Table 9

Second-Order Oblique Factor Structure Matrix

	Factors		
	I	II	III
1		0.86	
2	0.74		
3	0.79		
4		0.76	
5	0.67		
6	0.75		
7			0.97

Only values of .50 and above are included.

Table 10

Second-Order Oblique Factor Pattern Matrix

	Factors		
	I	II	III
1		0.86	
2	0.72		
3	0.80		
4		0.76	
5	0.65		
6	0.75		
7			0.95

Only values of .50 and above are included.

Table 11

Intercorrelation Coefficients of Second-Order Factors

	Factors		
	I	II	III
I	1.00	0.01	0.15
II	0.01	1.00	0.01
III	0.15	0.01	1.00

Discussion

This instrument appeared to be effective in measuring the presence of the constituents of achievement motivation within the limited response repertoire of preschool children. Young children are familiar and comfortable with the simple story format. The additional simplicity of both the illustrations and the written descriptions seems to increase their power as general representations and to avoid the attraction of actual situations. Indeed, analysis of the effect of the illustrations indicates that it may be possible to increase their simplicity without sacrificing their effectiveness. This instrument does not require complex verbal skills to describe introspective visions, but only some indication of selection, capable of being performed by virtually all four-year-olds. Furthermore, because only dichotomous options are used, the children easily make their selections and are not bogged down with complex and abstract evaluation discriminations.

The Gumpgookie figure, as well as the child's participation in finding his own Gumpgookie, seemed to have enough fascination to hold interest throughout the items and give the entire test unity. The Gumpgookie also seemed to alleviate the anxiety of children threatened by either the testing situation, or too close identification with another figure more nearly like themselves, without decreasing the scale's direct relationship to those variables specifically related to motivation to achieve.

In addition, this instrument does not assume universal experience, but presents a standard series of situations to which the child can respond, thus attempting to scale the amount of motivation to achieve that they have learned. By the use of a specific group of items, each child is scored against a common core of referents which allows individual rating against a set standard, estimation of gains reflecting progress, and elimination of rater idiosyncracies and criterion contamination evident in behavior rating techniques. Through simulation of behavior tests in the items, it is also possible for this instrument to tap a wide variety of situations and reduce the influence of situation-specific reactions. Since these items also eliminated the need for performance in the situation, they measure only covert responding as to what would be done; this is in essence closer to basic motivation. In this way, the various types of covert responses constituting achievement motivation have been crudely quantified.

Some evidence for the hypothesized seven types of such covert responses is found in the underlying factor structure obtained through factor analysis. The problem of attempting to identify factors based upon item scores especially in relatively untried domains, is substantially more acute than in the case of interpretations based upon more reliable total test scores, particularly in areas for which more experience is available. Not surprisingly, a number of the Gumpgookie items are not pure measures of a single factor but are loaded on several factors. In a factor anal-

ysis of inter-correlations of the items of the sort involved in this study, substantial correlations among factors were anticipated. For some factors having appreciable loadings for only a small number of items, the problems of factor identification is even more difficult. There was also the fact that certain items that appeared similar on an inspectional basis were not loaded on the same factor.

Nevertheless, the data from the first-order and second-order analyses taken together did seem to warrant some tentative conclusions as to the nature of the factors. The results should prove especially useful in suggesting directions for further development and refinement of the instrument.

Factor 1 appears to measure cognitive knowledge of and preference for instrumental behavior effective in achieving. Such behavior includes individual initiation and pursuance of achievement, requires realization of the relevance of behavior to achievement including implications for other times and people, and bases itself on a fundamental enjoyment of achievement-oriented behavior. Three items loading on this factor are:

65: Teacher is showing the Gumpgookies how to do something.
This one is watching.
This one is bothering.
Which is yours?

81: This one tells stories.
This one listens.
Which is yours?

94: These Gumpgookies could not write their names.
This one tried again and again.
This one soon gave up.
Which is yours?

Factor 2 seems to relate conceptual views of self as achiever and desiring achievement with recognition of personal responsibility for achievement. Three items loading on this factor are:

156: These Gumpgookies are learning numbers.
This one is getting tired.
This one is getting smarter.
Which is yours?

164: These Gumpgookies lost the game.
Teacher didn't like this one.
This one didn't know how to play.
Which is yours?

184: These Gumpgookies are working.
This one is just starting.
This one is almost done.
Which is yours?

Factor 3 is tentatively identified as relevant to ethical evaluations of self as a successful achiever and of situations as having achievement potential. Three items loading on this factor are:

109: This Gumpgookie needs to learn more.
This Gumpgookie knows enough.
Which is yours?

128: This Gumpgookie does what it wants to.
This Gumpgookie does things well.
Which is yours?

130: This Gumpgookie has rich friends.
This Gumpgookie has smart friends.
Which is yours?

Factor 4 includes a variety of personal characteristics related to achievement motivation such as optimism, curiosity, autonomy, concentration, organization, and competence. These characteristics were again coupled with a belief in ultimate success that permeated the majority of the factors. Three items loading on this factor are:

3: Today---
Something bad will happen to this Gumpgookie.
Something good will happen to this Gumpgookie.
Which is yours?

7: The teacher helps this Gumpgookie write its name.
This Gumpgookie writes its name by itself.
Which is yours?

102: These Gumpgookies are looking at a feather.
This one wants to play with the feather.
This one wants to see the bird it came from.
Which is yours?

Factor 5 may be described as an affectively positive orientation toward school and particularly toward achievement in school. Three items loading on this factor are:

13: Sometimes this Gumpgookie would like to go home from school early.
Sometimes this Gumpgookie would like to stay after school.
Which is yours?

20: These Gumpgookies are working hard problems.
This one is doing a lot.
This one is getting them right.
Which is yours?

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This Gumpgookie knows enough.
Which is yours?

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This one is doing a lot.
This one is getting them right.
Which is yours?

29: This Gumpgookie thinks school is a place you have to go.
This Gumpgookie thinks school is a place to learn.
Which is yours?

Factor 6 is difficult to define but appears to involve the social implications of achievement behavior such as the feelings of parents and teachers. It, too, includes some of the self-confidence evident in Factor 2 and Factor 3. Three items loading on this factor are:

82: These Gumpgookies are tired of playing a game.
This one wants to stop and rest.
This one wants to keep playing until the end of one game.
Which is yours?

87: Teacher is talking to each Gumpgookie's parents.
This one doesn't know what teacher will say.
This one knows.
Which is yours?

115: This Gumpgookie's father thinks school is a waste of time.
This Gumpgookie's father doesn't.
Which is yours?

Factor 7 reflects purposive responses which establish as goals increasing knowledge and improving performance. Three items loading on this factor are:

18: This Gumpgookie can do lots of things.
This Gumpgookie can do things well.
Which is yours?

108: These Gumpgookies are playing school.
This one is the teacher.
This one is in the class.
Which is yours?

197: This one is doing a new dance.
This one is doing an old dance.
Which is yours?

The second-order factor analysis provided a much clearer three-factor structure. Factor I has loadings above .65 for first-order Factors 2, 3, 5, and 6, and is described as ability to evaluate self as capable of achieving and to seek out situations that offer positive affect for achieving. Factor II has high loadings for Factors 1 and 4, and is described as knowledge and performance of behavior instrumental in achieving as well as possessing complementing personal characteristics. Factor III is almost identical with Factor 7 and thus is defined as the utilization of achievement behavior and ultimate achievement as purposive goals.

It should be emphasized that the definitions of the factors are tentative and that definite naming of them as such would be premature. Additional data on a new sample will help to clarify the underlying structure of these responses. Further data should also shed light on the possible desirability of estimati a of the reliability of the scores on separate factors and item analysis against factor scores as criteria. These additional analyses will be carried out in the next phase of the development of this instrument.

Conclusion

This research has furthered the development of an effective method of measuring motivation to achieve in very young children. Based on analyses of the data collected, the instrument was revised and the factorial structure underlying the responses tentatively mapped. It is now necessary to cross-validate these findings and begin gathering data to explore the validity of this instrument. Research is also being planned to teach motivation to achieve to preschoolers using this instrument as a criterion measure.

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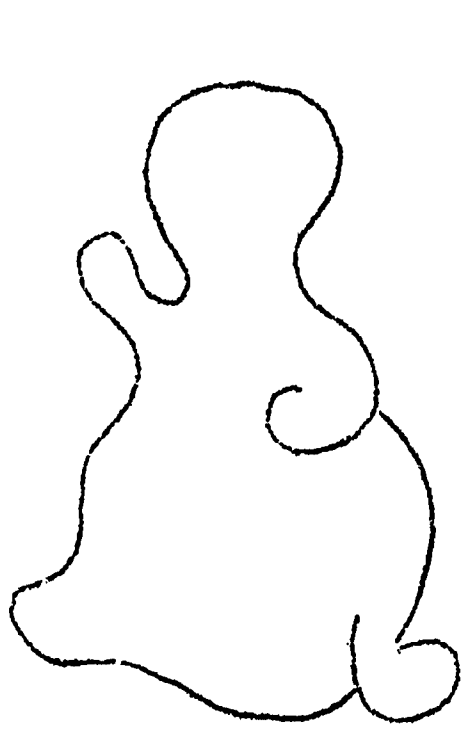
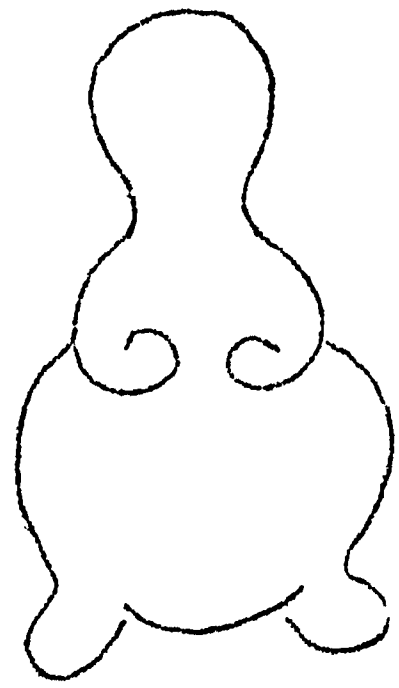
Appendix A

Illustrated Format





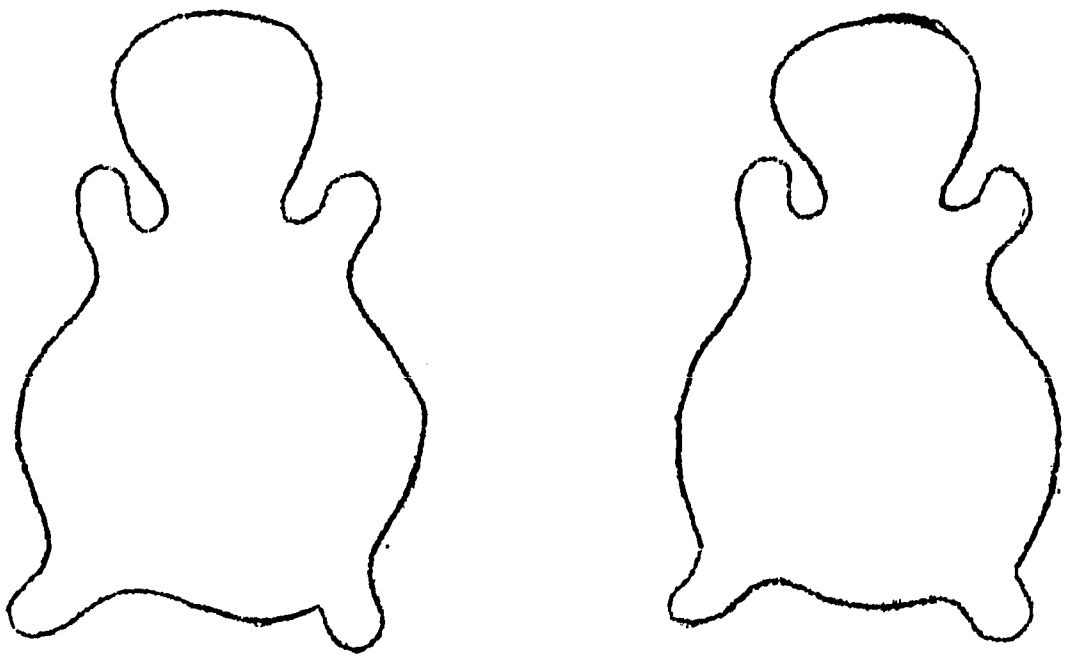
THE TEACHER WAS READING A STORY WHEN

THE RECESS BELL RANG.

THIS ONE WENT OUT TO PLAY.

THIS ONE STAYED TO HEAR THE END OF THE STORY.

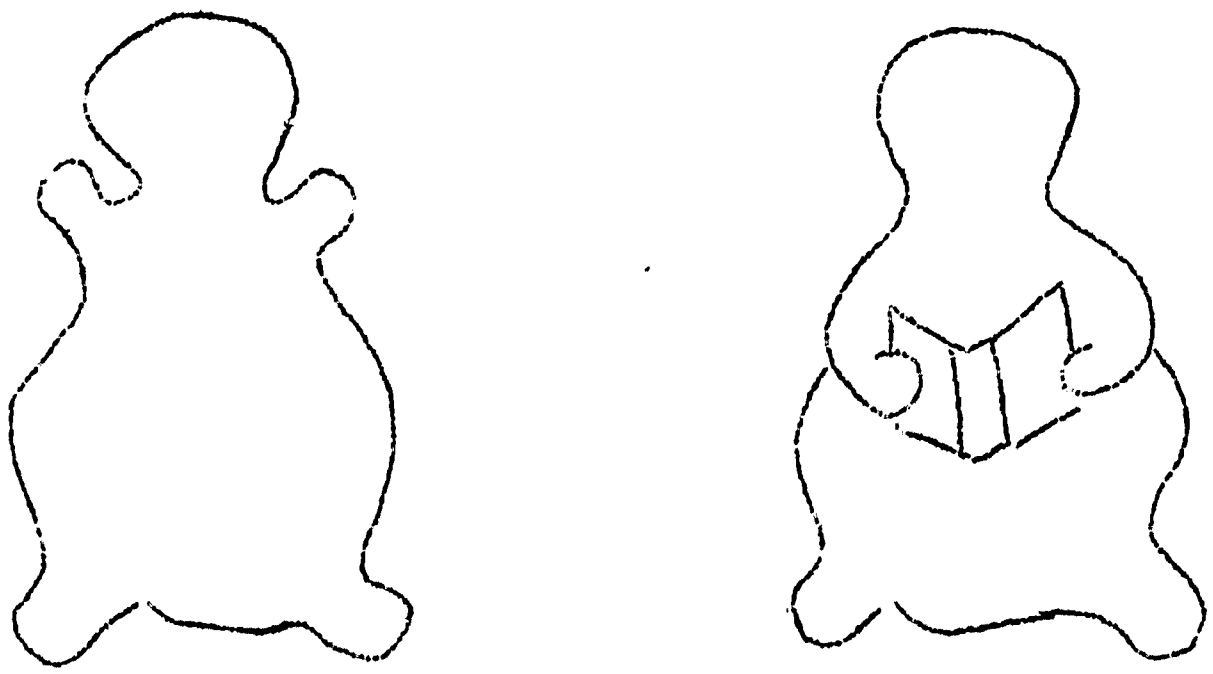
WHICH IS YOURS?



THIS GUMPGOOKIE CAN DO LOTS OF THINGS.

THIS GUMPGOOKIE CAN DO THINGS WELL.

WHICH IS YOURS?



THESE GUMPCOOKIES HAVE SCHOOL WORK TO DO.

THIS ONE IS PLAYING.

THIS ONE IS STUDYING.

WHICH IS YOURS?